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Are classroom internet use and academic performance higher after government broadband subsidies to primary schools?

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Are classroom internet use and academic performance higher after government broadband subsidies to primary schools?[1]

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INTRODUCTION

The connection of schools and other educational institutions to broadband networks continues to be high on the agendas of politicians and policymakers around the world. Successive Irish governments have invested in programmes to improve internet access for schools at both primary and second level. Policy statements have stressed the positive role broadband would play in education, arguing that it would "significantly enhance the potential of ICT in teaching and learning" and would "pay dividends in years to come" (DCMNR, 2004).

Yet there is relatively little evidence internationally on how effective broadband investments are at supporting teaching and learning in schools. There is plenty of research showing that the spread of information and communications technologies in general have had positive effects on educational outcomes, but the few studies focusing specifically on the effects of broadband have given contradictory findings, some finding no effect, others positive impacts and still others negative effects.

One such programme, which we refer to as Broadband for Schools (BFS), installed broadband service to almost all of Ireland's primary schools between 2005 and 2008, with most schools being connected in the first two years. In a fortunate coincidence, the period when broadband was installed in schools through BFS overlapped with surveys on the lives of 9-year-old children in the Growing Up in Ireland (GUI) project. This survey included questions on schools', teachers' and pupils' use of the computers and the internet, as well as results on standardised mathematics and reading tests.

In our paper we combined the data from the BFS programme and the GUI survey to investigate two questions. First, were primary school teachers more likely to use broadband in class if their schools had access for longer? And second, did

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students have higher reading or mathematics test scores if they were in classes where the internet was used?

We found that on average teachers were more than twice as likely to use the internet in class after broadband service was installed under the programme, but it took about two years for this gain to emerge. This is not surprising, because it takes time for teachers to learn to use new technologies and to change their teaching practices. In addition, teachers in schools with better computer-related facilities were also more likely to use the internet in class. However, having a faster connection speed (compared to other schools with broadband) showed no statistically significant effect.

We cannot be certain that the BFS programme *caused* more use of the internet by teachers. In particular, we do not know whether particular schools had some level of internet access before it was provided to them through BFS, and each school was only surveyed at one point in time (ideally, data would be collected before and after installation). However, the direction, timing and scale of the effect seem consistent with the expectation that public supports for broadband supply to schools would lead to more use of the internet.

Our second set of models showed that classes where the internet was used had significantly higher average mathematics and reading scores. The relationship was strong; for example, the average difference in mathematics test scores between children in classes with and without internet use was as big as the rise enjoyed by children whose mothers had completed a degree rather than finishing at the Leaving Cert. The mother's level of education is understood to have a strong influence on children's educational performance at this level.

These models also took into account many factors thought to affect pupils' exam performances, such as income, social class, parental education, intellectual disability and out-of-school activities. The effects from these factors were broadly consistent with theory and previous research.

However, as in the case of the internet use results above, we cannot be certain that the use of internet in the class *caused* higher mathematics and reading scores. It is possible that some other factor omitted from our data led to both higher use of the internet in class and better exam scores. For example, maybe some teachers were more effective than their peers in a range of areas but also used the internet more. Perhaps schools in better-off catchment areas (with more scope for fund raising) adopted the internet earlier outside BFS and thus gained an advantage not captured in our data. We have tried to control for both of these possible effects, but it is hard to be sure no outside factor drove the results.

Nevertheless, the positive direction and significant scale of these relationships is encouraging. We found no evidence for Ireland of the negative effects of broadband in schools reported in some studies internationally. Future research may be able to pin down the effects of broadband investments in schools with more confidence and to further explore the mechanisms through which school broadband investments might affect teaching and learning outcomes.

Department of Communications, Marine and Natural Resources (DCMNR) (2004). "€18m Schools Broadband Rollout Announced By Government", Press Release, 24 February.